DOCUMENT RESUME

ED 280 717 SE 047 880

AUTHOR Yee, Doris K.; And Others
TITLE Sex Equity in the Home: Parents' Influence on Their Children's Attitudes about Math.
PUB DATE 86
NOTE 9p.; Paper presented at the Annual Meeting of the American Educational Research Association (San Francisco, CA, April 16-20, 1986).
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Educational Research; Elementary Secondary Education; *Mathematics Education; *Parent Attitudes; Parent Student Relationship; *Sex Bias; *Sex Differences; Surveys
IDENTIFIERS *Mathematics Education Research

ABSTRACT

Three studies are presented which show that parents hold differential beliefs with respect to their sons' and daughters' mathematics competencies. In the first study, parents of students in grades seven and nine completed the questionnaire. In the second study, parents and students in grades five to eleven responded. The third study examined beliefs of parents of sixth graders. Research findings show that: (1) parents hold sex-differentiated beliefs about their sons' and daughters' mathematics achievement even though boys and girls perform similarly on math grades and standardized mathematics tests; (2) parents strongly influence children's mathematics attitudes and mathematics self-concept; (3) parents are strongly influenced by teachers' assessments of their children's abilities; and (4) mothers and fathers have different views about their own math abilities, and express different attitudes about mathematics. In light of these differential beliefs, several strategies are proposed to increase parents' awareness of the importance of mathematics and to enlist their help in promoting sex equity in mathematics participation. (MNS)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED280717

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

X This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

SEX EQUITY IN THE HOME: PARENTS' INFLUENCE ON THEIR CHILDREN'S ATTITUDES ABOUT MATH

Doris K. Yee, Janis Jacobs, & Rena Goldsmith

University of Michigan

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

Doris K. Yee

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

Studies 1 and 2 were funded by grants from the National Institute of Education (NIE-G-78-0022 - to Jacquelynne S. Eccles) and the National Institute of Mental Health (5R01-MH31724-01 - to Jacquelynne S. Eccles).

Study 3 was funded by grants from the National Institute of Mental Health (MH31724 - to Jacquelynne S. Eccles), the National Institute of Child Health and Human Development (HD17296 - to Jacquelynne S. Eccles), the National Science Foundation (BNS-8510504 - to Jacquelynne S. Eccles and Allan Wigfield), and the W. T. Grant Foundation (to Jacquelynne S. Eccles).

Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA., 1986.

Address correspondence to: Doris K. Yee, Achievement Research Laboratory, Institute for Social Research, Box 1248, Ann Arbor, Michigan.

SE040 880

Children's attitudes about math are influenced by parents' perceptions of their academic abilities, the value and importance their parents place on various subjects, and the ways in which they structure their children's environment. Parents' perceptions may develop differently for boys and girls and, as a result, their expectations and socialization practices may differ as well. This paper will present data from a series of studies focusing on parents' differential beliefs about their sons' and daughters' competencies in various domains, with special emphasis on their mathematical abilities, effort required to succeed in math, expectancies for future success in math, and motivation practices used to encourage their children in math. In light of these differential beliefs and practices, several strategies will be proposed to increase parents' awareness of the importance of math and enlist their help in keeping both females and males involved in higher-level math classes.

Research Findings

We will be talking about data from three different studies today. Due to time limitations, we will only mention the findings from each study that are relevant to policy recommendations. More detailed results are available elsewhere for each study. In all studies parents received questionnaires in the mail, completed them on their own, and returned them by mail. In general questionnaires contained Likert-scaled items assessing parents' perceptions of their own experiences in math and their own attitudes regarding math, parents' beliefs about their children's attitudes toward math, and parents' beliefs about their children's ability and effort in math.

Study 1

The first study ((Eccles) Parsons, Adler, & Kaczala, 1982) involved parents of primarily seventh and ninth grade students from 22 classrooms. The schools were located in a middle to upper class district. Both parents of 62% of the participating students and one parent of an additional 18% of the students completed questionnaires.

We found that sex of child had a definite effect on parents' perceptions of their child's math achievement, and on their perceptions of the relative importance of various high school courses. While parents did not rate their daughters' math ability significantly lower than that of their sons, they did think that math was more difficult for their daughters and that their daughters had to work harder to do well in math. Parents held these sex-differentiated perceptions of their children's math ability, despite the similarity of their sons' and daughters' actual performances, as measured by

math grades and standardized math tests. Further, compared to parents of daughters, parents of sons felt that math was more important than other subjects for their child.

Mothers and fathers differed in their perceptions of their own ability, effort, and interest in math. Compared to mothers, fathers reported higher self-concept of math ability and more positive attitudes towards math. While we have no evidence of mothers' actual performance in math, it is unlikely that mothers' lower math self-concept reflected lower academic ability, as mothers generally rated their high school performance higher than did fathers. These results support the stereotype of math as a male domain, and suggest that while mothers may have performed equally as well as fathers, mothers held more negative attitudes about their math experiences. Further, these results suggest that boys and girls may differ in their attitudes toward math because their parents have sex-differentiated beliefs about their own math ability. However, we found that parents' math-related self-perceptions were unrelated to their children's perceptions about their own math ability.

Instead we found that parents' perceptions of and expectations for their children were strongly related to their children's self-concepts, future expectancies, and course plans. Further, parents' beliefs were more directly related to children's self-concepts, expectancies, and course plans than were the children's own past performances in math. In short parents who think that math is hard for their children and who think that their children are not very good in math have children who also possess a low self-concept of their math ability, see math as difficult, and have low expectancies for their future performances in math.

Study 2

The second study (Jayaratne, 1983) involved approximately five hundred parents and their fifth through eleventh graders. These parents answered similar types of questions as were asked in Study 1. Generally, the pattern of responses replicated and strengthened the findings from the previous study. Compared to parents of daughters, parents of sons reported more positive perceptions of their child's math achievement, even though in this study daughters were performing better than sons according to standardized math tests and math grades. Compared to parents of sons, parents of daughters believed that their children had to try harder to succeed in math, and that trigonometry and calculus were less important for their daughters. When asked about their own math skills, mothers reported much more negative views than did fathers. But again, parents' math-related self-perceptions were not related to their children's perceptions about their own math ability.

Study 3

The current study (Eccles, Jacobs, Flanagan, Goldsmith, Barber, Yee, & Carlson, 1986) is a 4-wave longitudinal study examining changes in students' self- and task-related beliefs as they move from elementary to junior high school. The findings reported here are from the first two waves of data collection, and include only parents of sixth graders. The sample consists of approximately 3700 students and 3300 parents spanning 12 school districts. Based on our earlier findings that parents' perceptions and expectations significantly influenced their children's math-related beliefs, we wanted to find out how parents communicated their perceptions and expectations to their children. In this study parents were asked about their perceptions of their children's ability and effort in both math and English. They were also asked about motivation practices they used to encourage their children in math, and what sources of information they used to determine their children's math ability.

As we found in previous studies, parents' math-related perceptions and expectations for their children were strongly related to their children's perceptions of their own ability and valuation of math. Mothers who believed that their daughters had to work harder to succeed in math had daughters who felt they were were less able in math, and expressed less interest in math. Such a pattern did not prevail for fathers in this study. However, both mothers and fathers reported that it was more important for their sons to do well in math, and both were more likely to encourage their sons to take more math. Parents' perceptions of their children's math ability and effort were strongly influenced by teachers' ratings of their children's math ability. However, children's views of their own math ability and valuing of math were more strongly related to parents' perceptions of their math ability than to teachers' perceptions.

One hypothesis tested in this study is that parents hold differential views of sons' and daughters' relative abilities. Parents who believe that sons' and daughters' abilities lie in different areas may channel them into different activities. To test this hypothesis, parents' perceptions of their sons' and daughters' ability and effort in math and English were compared. Several important findings emerged. First, parent beliefs about sons' and daughters' relative abilities differed according to sex of parent, sex of child, and child's ability level as measured by teachers' reports. In particular, parents' perceptions of their children's interest, valuing, effort needed to succeed, and expectancies for future success in math and English were strongly influenced by children's relative abilities, as measured by teachers' ratings. Second, and most important for our differential socialization hypothesis, we found that while parents believed that daughters generally performed better than sons in academic subjects, parents felt that daughters were more able in English while sons were more able in math. This finding indicates that while parents believe that

daughters are equally as talented as sons in academics, they are more likely to believe that sons' academic strengths lie in math. Based on these beliefs, parents may encourage sons and daughters to take different courses and channel sons and daughters into different types of activities.

To find out how parents communicate their perceptions to their children, we asked parents about various strategies they used to motivate their children in math. We found that fathers used more strategies than mothers and parents in general used more strategies to motivate their sons than daughters. Parents of sons were more likely to take away privileges for poor performance, offer rewards for good performance, discuss future usefulness of math, and make their child do their math homework. In addition, parents of sons, especially fathers, were more likely to tell their child that they should be ashamed of their math performance.

Finally, parents were asked about information they used to assess their children's math abilities. Parents uniformly told us that the most helpful sources of information were children's grades and/or placement in an ability group, children's comments about math, and parents' own observations about how easy or difficult math was for their children to learn. Least helpful sources of information were courses selected by their children (not surprising since few sixth graders are allowed this option) and comparing their children's math performance to that of other children.

Policy Recommendations

These research findings suggest that parents need to be informed that they can play an important role in promoting sex equity in math participation. Programs targeted toward parents need to be aware of the following:

1. Parents have a strong influence on children's math attitudes and self-concept. Our research shows that girls have lower self-concept in math when parents believe they have to try harder in order to succeed in math. Further, children's math attitudes and self-concept are more strongly influenced by parents than by either teachers or children's own past performances. These findings suggest that parents need to be aware that they play an important role in their children's developing self-concept of ability in math and valuing of math.

2. Parents hold sex-differentiated beliefs about children's math achievement even though sons' and daughters' actual performances are similar. They believe that math is more important for sons, and are more likely to motivate their sons to do math as well as encourage their sons to take advanced math.

In contrast they believe that daughters have to work harder to succeed in math. These trends have been found in three separate studies spanning an eight year period. These findings suggest that it is important to convince parents that math is important for both daughters and sons, and that daughters and sons have equal potential to succeed in math. Daughters as well as sons should be motivated in math and encouraged to take higher level math courses.

3. Parents are strongly influenced by teachers' assessments of their children's abilities, as reflected in grades they assign or children's placement in an ability group. Parents believe that boys' strengths lie more in math, and girls' strengths lie more in English. These findings suggest that teachers need to be aware of the important role they play in shaping parents' perceptions of their children's abilities. Teachers need to inform parents about children's abilities, and make special efforts to point out girls' skills in math and boys' skills in English, when appropriate. Conversely, parents need to seek out such information from teachers and schools when it is not provided.

4. Mothers and fathers have different views about their own abilities in math and express different attitudes about math. Fathers tend to have a higher estimation of their math ability and feel more positively about math experiences. These findings suggest that efforts should be directed toward enhancing mothers' math self-concept of ability and math attitudes. Further, because fathers tend to feel more positively about math, they can play an important role in shaping similar attitudes in their children.

There are currently several programs targeted toward parents to enlist their help in promoting sex equity in math participation. For example, Dr. Fennema's program entitled "Multiplying Options and Subtracting Bias" uses candid interviews, dramatic vignettes, and expert testimony to inform parents about the problem of female math avoidance. The EQUALS program in California uses a combination of printed materials, workshops, and focus groups of women in math-related professions in order to sensitize parents toward the importance of encouraging daughters' involvement in math activities. One module entitled "Startling Statements" alerts parents to the amount of math needed for various professions and to the salary differential between men and women. Another module entitled "Family Math" is geared specifically to early elementary school-aged children and teaches parents various activities that they can do with their children in order to stimulate their interest in math. A new module currently being developed with a working title of "Dinner Table Math" will teach ways to integrate math activities into day-to-day family life. Finally, political action groups such as NAACP, the Urban League, and PEER (Program on Equal Education Rights), a lobbying arm of NOW, are currently disseminating information to parents with the idea of empowering them to help their chidren prepare for the future.

It is crucial in today's high tech society for parents to recognize the need to encourage both sons and daughters to continue their math education. Programs targeted towards parents need to increase parents' awareness of the important role they play in shaping their children's math abilities and math attitudes. Parents may benefit from the following types of interventions: information about career possibilities, including information about how to direct children to the appropriate math courses or work experiences; suggestions for toys/equipment (e.g., calculators, computers) that parents may want to make available to their children; and focus groups with women who work in business, academic, science, or computer fields. If educators are made aware of the important role of parents, schools may be induced to provide parents with more information about courses, careers, extracurricular activities, and their children's performance to allow parents to give better advice. Finally, the media play a critical part in socializing both parents and children. With increased coverage of women's successes in math-related fields as well as the portrayal of competent women characters in books, television programs, and movies, parents can begin to see new possibilities for their daughters.

References

(Eccles) Parsons, J. S., Adler, T. F., and Kaczala, C. M. (1982). Socialization of achievement attitudes and beliefs: Parental influences. Child Development, 53, 310-321.

Eccles, J. S., Jacobs, J. E., Flanagan, C., Goldsmith, R., Barber, B., Yee, D. K., & Carlson, E. (1986). Parental influences on children's achievement attitudes and beliefs: A differential socialization hypothesis. Manuscript in preparation.

Jayaratne, T. E. (1983). Sex differences in children's math achievement: Parental attitudes. Paper presented at the biennial meeting of the Society for Research in Child Development, Detroit, MI.

Kaseberg, A., Kreinberg, N., and Downie, D. (1980). EQUALS to promote the participation of women in math. Berkeley, CA: Math/Science Network.

National Council of Teachers of Math. (1984). Handbook for conducting equity activities in math education. Reston, VA.